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APRIL 9, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

ECHNOLOGY DEPARTMENT

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DETROIT

Courtship Dance

See Page 228

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VOL. 55 NO. 15

Vibration Control

Columbian Humming Birds, one of the famous drawings from nature by John James Audubon.

Wing vibration, nimbly controlled, keeps the humming bird in flight, enables it to feed without alighting.

Electric vibration is the essence of telephone transmission. Voice, music, pictures, teletype — no matter what type of signal — the story is told by the frequency and strength of not one, but many vibrations.

Learning how to control electric vibrations to pin-point accuracy has been one of the basic jobs of Bell Laboratories scientists in their development of the "carrier" art which enables the sending of many more conversations over existing wires. Among their inventions have been oscillators, modulators, filters, coaxials, wave-guides, and radio lenses.

Constantly Bell Laboratories scientists discover new and better ways to control and adapt electric vibrations by wire or radio to the needs of the telephone user. Their pioneer work in this field is one important reason behind today's clear, dependable and economical telephone service.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting, for continued improvements and economies in telephone service.

GENERAL SCIENCE

Research Recovery Urged

Dr. Karl Compton advocated the use of recovery funds to restore research in foreign lands. He emphasized economic recovery rests on technology based on research.

➤ USE of recovery funds to restore scientific research programs and institutions in war-devastated lands was advocated by Dr. Karl T. Compton, eminent physicist and research leader. Dr. Compton, who is chairman of the Research and Development Board of the U. S. National Military Establishment as well as chairman of the Corporation of the Massachusetts Institute of Technology, spoke before the opening session of the Mid-Century Convocation on the Social Implications of Scientific Progress.

"To my way of thinking," he said, "it would be a helpful and legitimate thing if those countries whose programs of scientific research were most seriously disrupted by the war would see fit to include funds for the rehabilitation of those programs in their requests for U. S. aid under the provisions of the Foreign Assistance Act of 1948. I believe that such requests should be sympathetically received, since sound plans for economic development must rest upon technology supported by fundamental research."

Dr. Compton pointed out several historical precedents for scientific spending in order to promote economic reconstruction. Louis XV of France in the eighteenth century made large expenditures from his treasury for the promotion of research, as a part of a broad recovery plan to help the country out of the depression into which it had been plunged by the extravagance of his predecessor, Louis XIV. Similarly, after the Napoleonic wars Germany started programs of applied science, and after World War I Britain set up a million-pound research fund.

"It is to be hoped," he continued, "that our leaders of public affairs, in government and business and the professions, will be no less far-sighted than those statesmen of earlier days. The post-war interest in research shown by our military departments, the favorable prospects for a National Science Foundation, and above all the recently increased liberality of American industrial corporations in support of fundamental research within and without their organizations, are all encouraging signs."

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AGRICULTURE-SOCIOLOGY

People Before Profits

➤ PRIVATE enterprise in the Americas since the war has been taking a new direction, working with the idea of people before profits, in one venture described by its president, Nelson Rockefeller, speaking before the Massachusetts Institute of Technology Mid-Century Convocation on the Social Implications of Scientific Progress.

The enterprise, which has until now been operating so privately that few people have heard of it, is the International Basic Economy Corporation, which is undertaking to increase agricultural production in underdeveloped areas. It was founded under Mr. Rockefeller's leadership by a group of American capitalists who had played a part in the prewar good-neighbor policy and in international cooperation during the war, and who are now undertaking to carry on the same kind of thing in cooperation with businessmen of other lands, without depending on governmental sponsorship.

"We believed that American capitalism was ready to play a new part in world affairs—not seeking just the areas which promised the greatest profit, but going to the areas of greatest needs. We believe that it was ready to go where it could produce the most goods and render the greatest services, and, finally, that it would have the ingenuity and resourcefulness to accomplish these things on a sound and profitable basis which would contribute to the well-being and real wealth of the people it served."

Of the two "pilot areas", Venezuela and Brazil, in which this unique corporation is operating, Mr. Rockefeller chose Brazil as a sample of performances to date.

One alien insect pest, known as the broca, has been costing Brazilian coffee growers as much as 100,000,000 dollars annually. A helicopter dusting company has now been formed, which seems to be the answer to the broca problem.

To increase grain production without paying the heavy penalty of rapid soil erosion from which Brazil has been suffering, modern methods of land clearing, terracing, and cultivation have been introduced. For most economic returns on investments in heavy machines, these are operated almost around the clock on a three-shift basis.

Corn is Brazil's basic food, yet Brazil had no hybrid corn and no modern mechanized production and storage methods. A hybrid seed company was set up and is already producing seed that yields 35% to 40% more per acre than open-pollinated strains now in use. Grain elevators are planned that will cut handling costs by more than two-thirds. To use more corn and cut the costs of meat production, new hog breeds have been introduced, together with handling methods adapted to the needs of small farmers.

"The operation of all of these companies involves not only the introduction of new methods and modern equipment but also the changing of life-long habits of production and distribution," said Mr. Rockefeller. "This is not easy and takes time."

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NUCLEAR PHYSICS

Giant Blowers Built To Cool Atomic Pile

➤ GIANT 12-foot-high blowers which can move 80,000 cubic feet of heated air a minute have been built to cool an atomic pile.

These huge air movers were made by the Sturtevant Division of Westinghouse and will be used at the atomic pile now under construction at the Brookhaven National Laboratory, Upton, N. Y. Despite their size, the blowers are "unusually quiet," Westinghouse engineers said. Centrifugal compressors revolve at a speed of 450 miles per hour in the blowers. An all-steel wheel, approximately three and one-half feet in diameter and with nine forged blades welded to a solid hub, is at the heart of each of the units. They are driven by a 1,500-horsepower motor.

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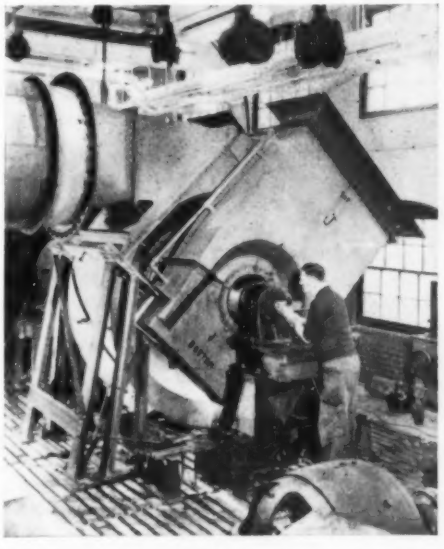

ATOMIC BLOWER—One of the blowers that will cool the atomic pile now being constructed at Brookhaven National Laboratory, Upton, N. Y.

VETERINARY MEDICINE

Foot-Mouth Virus Culture Made from Tongue Tissue

➤ VACCINE against aftosa, or foot-and-mouth disease, may eventually be produced without having to make a whole cow sick. In the meantime, investigations of this costly menace to the livestock industry can be carried on in the laboratory, growing the virus on tissue from near the upper surface of a slaughtered cow's tongue.

How this is done was demonstrated in a motion-picture lecture presented before the Society of American Bacteriologists in Washington, by Dr. Harry W. Schoening of the U. S. Department of Agriculture. The film was made in the veterinary research laboratory of the Netherlands Department of Agriculture, where the scientist in charge, Dr. Herman Frenkel, originated the tissue-culture method for keeping the virus growing. American and Dutch scientists have been collaborating there in efforts to find better means for fighting the epidemic of aftosa now raging in Mexico. A colleague of Dr. Schoening's, Dr. Irvin Eichhorn, who has been in Europe on this mission, took the pictures.

The tissue selected for the propagation of the virus outside the body of a living animal comes from just beneath the upper surface of a cow's tongue. This is kept in fresh condition in a dish of Tyrode's solution, a physiologically balanced mixture of the chemicals normally found in the body fluids.

The tissue-culture method has great practical advantages over the study methods hitherto used in aftosa studies, Dr. Schoening pointed out. Inoculating a live cow with the disease is expensive, in terms of both first cost and upkeep, besides being pretty tough for the cow. The tongue material used can be obtained in any desired quantity from slaughterhouses, at very low cost.

At present, the tissue-culture method is being used primarily for research on the virus, but its eventual employment in large-scale production of aftosa-preventing vaccine is being considered. If this is successful, it will obviate the present costly necessity of making some cows sick in order to save the health of others.

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ENTOMOLOGY

DDT Not Poison To Insect Hearts

➤ DDT is not a heart poison to insects, Prof. Demorest Davenport of Santa Barbara College demonstrated in a series of experiments. The hearts of the insects he used kept right on beating after the rest of the bodies were thoroughly poisoned with DDT.

Jerusalem crickets, incidentally, is more than a mild form of "cussing". The insects used by Prof. Davenport were Jerusalem crickets.

Science News Letter, April 9, 1949

Science Service Radio

➤ LISTEN in to a discussion on "Bigger and Brighter Easter Lilies" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, April 16. Dr. Samuel Leonard Emsweller, a principal horticulturist at U. S. Department of Agriculture, Bureau Plant Industry Station, Beltsville, Md., will be the guest of Watson Davis, director of Science Service. Dr. Emsweller will tell where and how we got Easter lilies, what is being done to produce even whiter and statelier ones, how they are propagated and grown, and something of the ills they suffer and what can be done about them.

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On This Week's Cover

➤ SHAM battles and strutting on prairie knolls mark the annual spring courtship dances of the sharp-tailed grouse.

Only the cocks perform, while the hens quietly watch the unique dances. There is strutting, clicking and mock combat—all to impress the watching hens.

The dancers gather at sunrise and sunset. First, there is the sound of whirring wings, followed by a low "cac-cac-cac-cac" and short "gobbles."

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NATURAL RESOURCES

Sea Water To Fresh Water

Ocean brine, with salts removed, may be used to meet domestic demands. Compression distillation, chemical methods and refrigeration are possible ways.

➤ SCIENTISTS are looking toward the ocean to get additional fresh water to meet increasing demands made by homes, industry and agriculture. Congress is now considering an appropriation to investigate possible commercial methods of getting drinkable water from the ocean brine.

The supply of fresh water from the usual sources is not inexhaustible, as many suppose. The underground water level is getting lower and lower in many parts of the United States. A crisis is foreseeable. The increasing population and the tremendous amount of water now used in industrial operations and irrigation are responsible for the impending shortage. There is plenty of water in the oceans. The problem is to freshen it, and to do so at reasonable cost.

Ordinary distillation is the long-used process, and many vessels at sea operate shipboard stills to get their fresh water from the ocean. The process, however, is too costly to use for getting a city domestic supply. A more economical method is essential. The proposed investigation would concern itself with all possible methods, both chemical and physical.

One possible method, known as the vapor compression distillation process, has been developed by Arthur D. Little, Inc., Cambridge, Mass. It was tested on a large scale by the armed forces during the war. Over 1,000,000 men were supplied with fresh water from sea water on islands in the Pacific and on the mainland beachheads. Overall cost of this method is about one dollar for 1,000 gallons. Further refinements of the method may make the cost lower.

In compression distillation, a little preliminary heat is used to get a small amount of steam. This steam is mechanically compressed. The process raises its temperature as steam, and also raises the temperature at which it condenses to water. The temperature raise means that heat is given off. This heat is used to evaporate more of the water in the still. As long as the pressure is kept up, the process is continuous. Fuel is used to provide the mechanical pressure, but not to heat the water as in ordinary distillation.

Chemical means of getting drinkable water from the ocean were successfully used during the war in lifeboats and liferafts. One kit used contained silver alumino silicate in a treatment bag. When ocean water was added two insoluble compounds were formed. These were strained out by a cotton filter in the reaction bag.

The so-called ion-exchange process, used for many years in softening water in homes, is regarded as a possible method of freshening sea water. An ion is an atom with an electric charge upon it. In the ion-exchange process, harmless portions of an added substance are swapped for the unwanted impurities in the water. The process has other applications in addition to the purification of water.

Synthetic resins are sometimes used as ion-exchange materials. In the process the sodium ions of the salt of sea water are replaced by hydrogen ions. In another bed of ion-exchange material, the chloride ions of the salt are replaced by hydroxyl ions from the water. The result is that the salt in water is replaced by pure water, giving as a final result a demineralized water.

A mixture of synthetic resins, a recent discovery, permits both exchanges to take place at the same time without interference with each other. After use, the resins can be separated, regenerated, and then remixed for repeated use.

Refrigeration of sea water is another process seriously proposed. It has been a laboratory technique for some time. Nature also practices this scheme on a large scale. Ice floes in polar regions are pure water, it is claimed. A practical method for commercial use of freezing the salt out of sea water, however, has not yet been developed.

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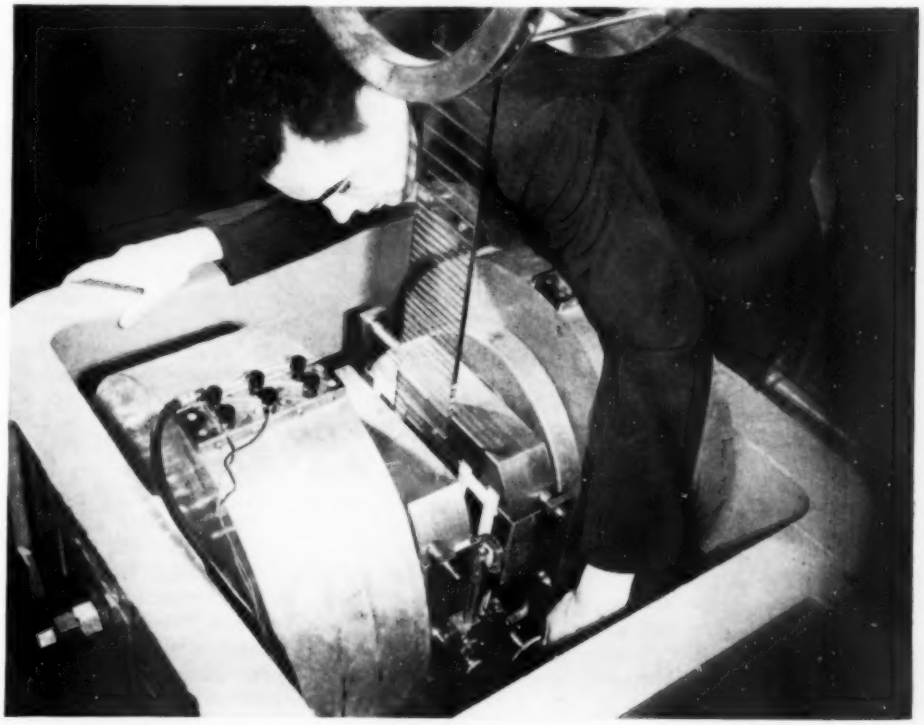
NUCLEAR PHYSICS

Basic Computations Made More Accurately

➤ TWO mathematical computations which are of basic importance in the whole field of atomic and nuclear physics have been recalculated with "unprecedented accuracy" by scientists at the National Bureau of Standards .

The computations are: the absolute value of the magnetic moment of the proton; and the value of the basic constant e/m—electric charge to mass ratio of the electron. These provide needed fundamental knowledge about the atom for researchers working on the practical applications of atomic energy.

The computations give a standard for measuring magnetic fields, the possibility of a redetermination of all other physical



MAGNET ASSEMBLY—Dr. A. H. Thomas of the National Bureau of Standards is shown adjusting the position of a nuclear resonance detector to plot the strength of a magnetic field at various points. This is part of the apparatus used to recalculate two basic mathematical computations in the field of atomic physics.

constants dependent on the measurement of magnetic fields and a method for the stabilization of magnetic fields at an accurately known value.

Protons, or positively charged particles, and neutrons, or uncharged particles, make up the nuclei of atoms. Each proton which carries an electric charge equal and opposite to that of an electron, and 1840 times as heavy, spins on its own axis. When a proton is placed in a magnetic field, the positively charged particle will line up with its axis parallel to the magnetic lines of force. The magnetic moment of the proton is a measure of this interaction with magnetic fields.

Ordinary water was selected as a convenient proton sample because each hydrogen atom has a single proton as its nucleus while all other kinds of chemical atoms have nuclei made up of both protons and neutrons. This calculation of the magnetic moment will be especially helpful in the operation of giant electromagnets which are used as atom "smashers".

The basic constant which was recalculated gives physicists a more precise mathematical base on which to erect the staggering computations of electronics research.

This experimental work was performed by Dr. H. A. Thomas, R. L. Driscoll and J. A. Hipple. Dr. Edward U. Condon, director of the Bureau, termed this work "of the utmost significance in nuclear and atomic physics at a time when much research required this knowledge."

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PHYSICS-CHEMISTRY

Thermal Analysis Used To Study Materials

➤ A LABORATORY method known as differential thermal analysis has been valuable in studying the composition of materials containing clay minerals, carbonates, hydrates, sulfides, zeolites, chlorites, and some silicates, scientists were told at the New York Academy of Sciences meeting by Dr. Ralph E. Grim, State Geological Survey, Urbana, Ill.

The method of differential thermal analysis determines, by suitable apparatus, the temperature at which thermal reactions take place in a material when it is heated continuously to an elevated temperature, and the intensity of such reactions. Because of dehydration, oxidation reactions, destruction of lattice structure and changes in crystalline phase, many substances undergo thermal reactions, and the temperature of the thermal reactions, their intensity, and general character are characteristics of the particular material.

The equipment used in the process consists of a furnace with controls to provide a relatively uniform rate of temperature increase. Then there are specimen holders, thermocouples and other electrical instruments to measure and record the electromotive forces set up.

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CHEMISTRY-ENTOMOLOGY

Pyrethrum Synthesized

➤ SYNTHETIC pyrethrum for insect-killing sprays, prepared by two U. S. Department of Agriculture scientists, Dr. F. B. LaForge and M. S. Schechter, is chemically identical with the natural pyrethrum from flower-heads, except that the arrangement of atoms in the molecule has been shifted a little. This slight difference seems to be an advantage, for the synthetic product has a higher killing rate than the natural.

Several variants of the new synthetic have been prepared, and one of them has six or seven times more killing power than the natural pyrethrum. In quick knock-down effect the synthetics are at least as good as the old natural standby.

The higher fly- and mosquito-killing power of the new compounds will make it possible to prepare sprays and aerosols for space-spraying purposes without the addition of DDT. This is especially desirable where spraying has to be carried on under conditions that might result in food contamination. An aerosol spray without DDT would also have the advantage of not causing irritation to the nose and throat membranes of persons constantly exposed to it.

Synthetic pyrethrum preparations, Department entomologists emphasize, will be used primarily in sprays and aerosols where immediate results are desired. They have no residual effect; walls and other surfaces coated with them will not kill insects for months afterwards, as DDT-coated surfaces will. For residual effects, DDT will still be necessary.

Starting materials for the synthesis are pyruvic aldehyde and aceto-acetic ester. Basis of the first of these is propylene glycol, and the second is made from ordinary alcohol and acetic acid. All three of these raw materials are common industrial chemicals, obtainable in tank-car lots.

Pyrethrum synthesis frees this country from dependence on foreign sources of the natural poison. Before the war, most of the pyrethrum used in the United States came from Japan. When this source was cut off, we obtained a partial supply from plantations in Africa. The Japanese growers have not re-developed their old business, and the present price of natural pyrethrum is about six times as high as the pre-war figure.

Patents will be issued on the new synthesizing process, with rights assigned to the Department of Agriculture. Licenses to produce will be granted, royalty-free, to reputable private firms desiring to manufacture the new product. Several manufacturing chemical companies have already expressed interest.

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RADIO

Enlarge Television Field

➤ TELEVISION receivers located between transmitting stations of the same network operating on the same channel will be subject to little if any interference of one station with the other when frequency difference is eliminated by a new method known as television carrier synchronization.

The method was developed at the laboratories of the Radio Corporation of America, Princeton, N. J., in the television section under the direction of Ray D. Kell. Permanent synchronization equipment has been installed in Wilmington, Del., to reduce interference between WNBT, New York, and WNBW,Washington. It has also been installed, he said, at Sandusky, Ohio, to cut down co-channel interference between WNBK, Cleveland, and WWJ-TV, Detroit.

Use of synchronization permits a closer spacing of television stations on the same channel than is possible without this method of reducing interference between stations, he explained. It also enlarges the service area of television stations, thus enabling television to reach out to many more people. This is of particular importance to rural sections, making possible service that otherwise could not be obtained.

The equipment now in use between New York and Washington stations of National Broadcasting Company consists of two units, one at Wilmington and the other in New York. When the system is in operation, signals from New York and Washington stations are compared electronically at the output of two receivers at Wilmington.

Information regarding frequency differences of the two distant transmitters is carried as frequency modulation of a 1,000-cycle tone by telephone line to New York. The frequency shift of this tone is utilized to change the frequency of the New York transmitter. This automatic system keeps the New York transmitter on exactly the same frequency as the Washington station.

The use of synchronization will be extended when equipment is available to other areas which are troubled with the problem of interference where two or more stations are on the same channel. At present in the United States, there are 12 channels assigned to television with a total of 55 television stations using them. Construction permits have been granted for 67 additional stations, and over 300 applications for permits are in the hands of the Federal Communications Commission.

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CHEMISTRY-MEDICINE

Chemicals Play Dual Role

A newly isolated chemical found in turnips and cabbage may be a remedy for goiter and thyroid disorders in one situation and a cause in another.

➤ ORDINARY foods such as cabbage and turnips may play a double role in goiter and thyroid gland disorders. They contain a chemical that might be a remedy in one situation and a cause in another.

Latest discoveries in this complex field, made with the aid of radioactive iodine, were reported by Dr. E. B. Astwood of Boston at the meeting of the American College of Physicians in New York City. Dr. Astwood received the college's John Phillips Memorial Medal for his earlier work in discovering anti-thyroid compounds for the treatment of hyperthyroidism, the disease resulting from overactivity of the thyroid gland.

The new work was done by a young physician working with him, Dr. Monte A. Greer, and by Dr. Martin G. Ettlinger of Harvard University chemistry department.

The idea that goiter might be caused by eating certain foods or food chemicals as well as by lack of iodine in the diet is not new. But it was not until radioactive iodine became available that scientists were able to get good evidence for it. Even now, the work is so new that the importance of the anti-thyroid plant chemical as a cause of goiter has not been firmly established.

The chemical is L-5-vinyl-2-thiooxazolidone, called thiooxazolidone for short. It is an anti-thyroid chemical of the same type as that now used to treat the kind of goiter and sickness that comes from a too-active thyroid gland. In a person with a normal thyroid, the chemical's anti-thyroid action might cause simple goiter. It would do this because the chemically retarded gland would enlarge itself in an effort to function normally and produce enough hormone for the body's needs.

This newly isolated chemical in turnips might, Dr. Astwood pointed out, have been responsible for the recent epidemic of goiter in western Europe among the peoples who had to subsist largely on turnips and for the goiter observed in sheep fed on turnips.

The turnip chemical and other similar anti-thyroid chemicals that may exist in other vegetables might explain why goiter is by no means completely abolished, though it is strikingly reduced, when the iodine intake is increased by adding it to drinking water or table salt in regions where there is a lot of simple, or endemic, goiter. In such situations the gland may have to make up for not only a lack of iodine but also a positive anti-thyroid effect from some food chemicals.

Earlier tests of the possible role of vegetables in causing goiter and of known anti-thyroid chemicals were not conclusive for a number of reasons. One important one is that rats, used in some earlier tests, do not respond exactly as humans do to anti-thyroid substances.

Radioactive iodine has made possible more exact studies because the course of radioiodine collection by the thyroid gland of normal human subjects is regular and predictable, Dr. Astwood reported. When a single dose of anti-thyroid substance is given, the accumulation rate is temporarily slowed or stopped altogether.

For the studies he reported a tracer dose of radioiodine was given to normal persons and the rate of its collection by the thyroid was determined during tthe next hour or two. The human guinea pigs were then induced to eat a single item of diet in as large an amount as possible. The subsequent course of iodine accumulation in the gland showed whether or not the food contained a significant quantity of an anti-thyroid compound.

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INVENTION

Twin-Hulled Ship Plan Patented by Gar Wood

➤ GAR WOOD, well-known builder and racer of speed boats, has designed a revolutionary type of twin-hulled craft, on which he has just received U. S. patent 2,464,957. It can be built in any size, he states, from small rescue boats to ocean liners and airplane carriers.

Basis of Mr. Wood's design is a pair of long, relatively slender hulls, held side by side with an open space between them by a superstructure consisting of one or more decks well above the waterline. The outboard sides of these hulls are straight, but they curve towards each other on the inside, thus producing a giant venturi tube. Each hull has its own power plant, with a propeller and a rudder astern.

As the twin-hulled craft speeds forward, it gets a considerable degree of air-lift from the lower deck surface and the incurved throat of the 'tween-hulls space. Among other advantages claimed by the inventor are greater steadiness and maneuverability, reduced wave action and abatement of yawing and pitching.

For a given investment in displacement, he declares, the design will give much larger passenger accommodation in liners and greater deck area in carriers.

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RADIO

Video Images Recorded For Future Reproduction

➤ TELEVISION images such as appear on the receiving set are photographed and recorded for future reproduction by means of new equipment which was given its first public showing at the meeting of the National Association of Broadcasters in Chicago.

The system is called a kinephoto equipment. It is a product of the Radio Corporation of America. Basically it is a projection-type of kinescope, or picture-producing device, and a suitable camera, plus amplifiers and other accessories. The kinescope and camera are mounted on a double cabinet rack which houses power supplies and other essentials.

The equipment utilizes standard video signals supplied directly to it from the switching system in the television studio. The kinescope is a special five-inch flat-face aluminized projection-type cathode-ray tube having a short-persistence blue phosphor screen of high actinic value.

The motion picture camera can be supplied with sound recording equipment to place the sound track and picture on the same film, or the sound signals may be fed to a separate recorder which permits editing, re-recording, and dubbing.

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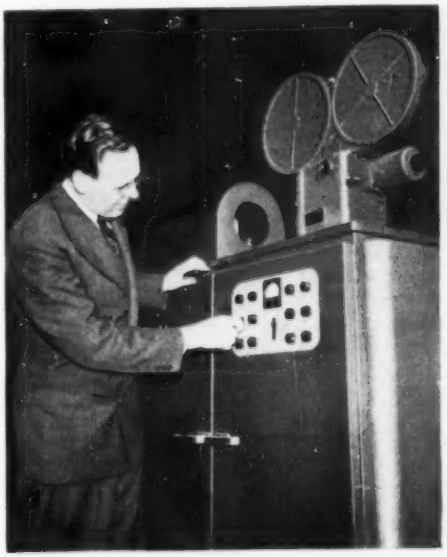


KINEPHOTO EQUIPMENT— ***Television images are recorded on motion picture film by this system consisting of a kinescope or picture-producing device, a suitable camera, amplifiers and other accessories.***

INVENTION

New Revolver Moves Cylinder to Rear

➤ A REVOLVER incorporating the first really radical change in design since the weapon was first invented by Samuel Colt more than a century ago has just been patented by Louis H. Palma of Nashville, Tenn.

In Colt's original revolver the rearmost part was the grip or butt, with the frame containing the cylinder in the middle and the barrel at the forward end. This pattern is preserved in today's revolvers.

In Mr. Palma's new revolver, for which he received patent 2,465,815 the cylinder has been moved to the rear, with the grip and trigger-guard underneath and in the center position, while the barrel extends over the top from cylinder to muzzle. The trigger activates a cam, which simultaneously revolves the cylinder and serves as a sear to cock and then trip the hammer, concealed in a cap behind the cylinder, by means of the rod or pin on which the cylinder turns.

Several advantages are claimed for the new arrangement. The considerably increased length of the barrel makes for greater accuracy of fire, as well as for higher velocity on a given type of ammunition. Reloading and cleaning are easier because the whole rear of the cylinder is left clear by swinging away the rear cap. Finally, the weight of the weapon is centered directly over the grip, making for greater steadiness in aiming and firing.

There remains the possibility of scorching the user's hand through side-flash in the clearance between cylinder and barrel. This, however, is neatly obviated by means of a guard that extends under the cylinder rearwardly from the grip.

Science News Letter, April 9, 1949

CHEMISTRY

More Gas Promised From New Process

➤ HERE's good news for you from chemists:

A new, low-cost process can help make high-grade gasoline from poor grades of crude oil.

Two new death-to-insects chemicals are five times as potent as DDT.

Not for cocktails, but with promising uses in industry is trimethylhexanol, the newest alcohol.

Getting high-grade gasoline from low-grade crude oil can now be done in a single step, two scientists from the Esso Standard Oil Company Laboratories, Baton Rouge, La., told the American Chemical Society in San Francisco.

Dr. Alexis Voorhies, Jr., and W. M. Smith explained that the process removes sulfur from the oil with hydrogen gas at relatively low pressures. Previous, more costly methods used hydrogen at high pressures, the chemists explained.

Just how much trouble sulfur can cause in the gas you use in your car has been measured by a team of DuPont chemists. H. K. Livingstone, J. L. Hyde and M. H. Campbell reported that only one-tenth of one percent of sulfur of the kind found in most gasoline will ruin the effect of half of the tetraethyl lead, added to prevent knock in your motor.

BNB and BNP are not new federal bureaus. They are new insect-killers which can control insects that survive DDT.

Dr. Henry B. Hass, of General Aniline and Film Corp., and formerly of Purdue University, synthesized the chemicals in collaboration with two Purdue graduate students, Drs. M. B. Neher and R. T. Blickenstaff. Dr. Walter O'Kane of the University of New Hampshire conducted tests of the new insecticides.

Dr. Hass said that the studies showed that BNB and BNP were only one-third as poisonous to mice as DDT. These newest weapons in the anti-insect arsenal are only two of hundreds of nitro paraffin chemicals which are being investigated.

Dr. W. M. Bruner of DuPont said that the new alcohol made from coal, petroleum, air and water, yields many chemical compounds. Some of these may be used in industry as synthetic lubricants, wetting agents and other applications, he indicated.

Science News Letter, April 9, 1949

PHYSICS-CHEMISTRY

Chemicals Analyzed by X-Ray Absorption

➤ A NEW branch of science known as X-ray absorptometry, which means measuring the amount of an X-ray beam absorbed in passing through a substance, promises to become increasingly important as a method of chemical analysis and of chemical control, the New York Academy of Sciences was told by Dr. Herman A. Liebhafsky of General Electric, Schenectady.

Measurements of X-ray absorption will not noticeably alter the sample under study, and a single measurement can often be made in a matter of seconds once the sample is in the beam, he said.

X-ray absorption is essentially an atomic property, he explained. An oxygen atom, for example, will show virtually the same X-ray absorption in the element as in any oxygen compound. Under tthe simplest conditions the absorption is independent of the physical state. This means that the amount of energy taken from an X-ray beam passing through a given mass of material is always the same, be the material hot or cold, or in a gaseous, liquid or solid form. The absorption per gram is the same in steam, in water, and in ice.

Science News Letter, April 9, 1949

IN SCIENCE

CHEMISTRY

Blistering of Plaster Prevented by New Process

➤ NO LONGER need housewives worry over the mess made by the blistering and bursting of the white finish coat of plaster on the walls of their homes. Also, building owners may save millions a year in repair bills, thanks to a new process of treatment of the lime used in the plaster, developed by the National Bureau of Standards.

The blisters are caused by the expansion of unhydrated magnesia in the lime, the Bureau determined after a thorough investigation. This magnesia makes a slow combination with water, causing volume expansion and resulting in bulging, blistering and buckling. Such water adsorption takes place slowly, the most failures occur several years after the white coat is applied.

The Bureau's treatment to prevent this type of failure involves the use of a kind of a pressure cooker that scientists call an autoclave. In it, heat and moisture are used to effect a chemical bonding of water with the components of the lime, giving a stable product.

As a result of the Bureau's work, several manufacturers are now producing a dolomitic lime, one containing magnesia, so well hydrated that harmful expansion does not take place, and no blisters form. Dr. L. S. Wells, of the Bureau staff, is responsible for the study and the development of the treatment cure.

Science News Letter, April 9, 1949

PHARMACOLOGY

Heart Disease Studies Use Radioactive Foxglove

➤ FOR better treatment of heart disease, plants are now being grown in a radioactive atmosphere. This application of atomic science to medicine was reported by David E. Lilienthal, chairman of the U. S. Atomic Energy Commission, at the meeting of the American College of Physicians in New York.

The plants are foxglove from which comes digitalis, long used in treatment of heart disease. To get more knowledge of the drug's action, with a view to better use of it, it is now being produced in radioactive form. This is done by growing the plants in air-tight glass jars in an atmosphere of radioactive carbon dioxide.

The small quantities of radioactive digitalis thus far produced are now being studied in animals in AEC laboratories.

Science News Letter, April 9, 1949

CE FIELDS

ENTOMOLOGY

German Chemical Is Deadly to Insects

➤ A CHEMICAL so poisonous to insects that it will kill them if they bite a plant that has taken it up through its roots was described before the meeting of the American Chemical Society in San Francisco by Dr. S. A. Hall of the U. S. Department of Agriculture. It is one of more than 300 organic phosphorus compounds originally produced by a German chemist, Dr. G. Schrader, the more promising ones of which are now being put through tests by the Bureau of Entomology and Plant Quarantine.

The compound, which has been so little known that it has no short common name or set of initials as yet, is octamethyl pyrophosphoramide. If it proves a practical means for enabling plants to poison their own attackers, it will probably be useful only on plants not intended for food, since most of the compounds in this group are toxic to human beings and domestic animals as well as to insects. However, it could still have large usefulness in the protection of fiber plants such as cotton and flax, as well as seedling trees, flowers and other ornamentals.

Science News Letter, April 9, 1949

CHEMISTRY

New Laboratory Tools Evaluate Oil Products

➤ YOU have got to know a lot of big words, such as tetramethyldiaminodiphenylmethane, and be skilled in laboratory procedures, such as a capillary-pycnometer technique, if you want to understand what oil chemists talked about at the meeting of the American Petroleum Institute's division of refining in Houston, Texas. Rapid means of analysis was the theme.

Much credit is due to them, however, for various processes developed for the rapid evaluation of petroleum products. Many of the methods employed utilize physical apparatus rather than older chemical analysis techniques. They use microscopes, distillation equipment, viscosity testers, colorimeters, infrared and ultraviolet apparatus, emission spectroscopes and other scientific devices of latter-day scientists and modern laboratory technicians. The result is that the contents of petroleum and its products are now revealable with accuracy and speed.

Methods found valuable for evaluating petroleum products when very small samples only were available were described by J. V. Sommer and G. E. C. Wear of the Standard Oil Development Company, Elizabeth, N. J. They explained apparatus and procedures, carried out on a microscale, which involve density or specific gravity, viscosity, and what is called Engler distillation.

A simple colorimetric method, usable by semi-skilled operators, by which the furfural content of lubricating oils can be determined in five minutes was described by A. R. Javes, Anglo-Iranian Oil Co., Ltd., Sunbury-on-Thames, England. It has been successfully employed for concentrations between .0001 and 1.0 percent, he stated.

A computing recorder for infrared spectra was explained by Robert W. Foreman and Warren Jackson, Jr., of Standard Oil Company, Cleveland, Ohio. It is a simple electric instrument that automatically computes the ratio of sample-cell transmission to blank-cell transmission and permits plotting percentage transmission of a sample directly.

A rapid colorimetric method for the determination of tetramethyldiaminodiphenylmethane in oils and greases using nitrous acid was presented by S. Walter Denton, R. M. Oliver and John T. Wiley of the Texas Company, Port Arthur, Texas. This chemical with the long name is commonly known as a methane base and is widely used in the dye and rubber industry.

Science News Letter, April 9, 1949

ENGINEERING

Process Aids Production Of Useful Light Gases

➤ LIGHT gases, which are building blocks for such products as anti-freezes, fertilizers and margarine may become cheaper and more plentiful as a result of a new method of petroleum gas separation.

The new process, known as hypersorption, was described by Clyde Berg of the Union Oil Company of California at the American Chemical Society meeting in San Francisco.

The hypersorption unit is a tall, round column with a cooler at the top and a steam section at the bottom. Between these two are very fine particles of charcoal which has been treated so that it will absorb the heavy gases in larger quantities than the light gases.

The method was first used to produce ethylene, from which glycol anti-freezes and ethyl alcohol are made.

Mr. Berg stated that this process could also be applied to recover hydrogen from catalytically cracked gases. Hydrogen is used in the production of margarine, of ammonia fertilizers and of many plastics.

Propane, which is burned in many homes as bottled gas, can be produced more cheaply and efficiently from natural gas by this new process, Mr. Berg said.

Science News Letter, April 9, 1949

MATHEMATICS-PSYCHOLOGY

Brain and Machine Conduct Are Predicted

➤ BROAD systematic theories which can describe and predict the behavior of both human brains and computing machines were discussed at a two-day conference on mathematical models in the social sciences at Harvard University.

Profs. John Von Neumann, of the Institute for Advanced Study, Princeton, N. J., N. Rashevsky of the University of Chicago and Norbert Wiener of Massachusetts Institute of Technology said that the basis of mathematical social sciences is being developed and is producing results today. Modern digital computing machines like the ENIAC, are the closest man-made approach to the nervous systems of living organisms, Prof. Von Neumann said. They resemble the network of nerve cells in the human brain, although they are very much simpler. Each individual unit of a computing machine can be isolated and its function described in relation to the whole machine. But individual nerve cells can be described mathematically only when they are performing extremely simple functions as small groups of cells. When large groups of cells such as perform the higher functions of human and animal brains are studied, only statistical behavior can be described.

Prof. Rashevsky told of differential equations which predict the behavior of neural systems in the large groups of cells. Even the simpler esthetic likes and dislikes can be handled. Differential equations have been set up to predict which ones of a set of geometrical figures people will like, and they give extremely close correlations with the preferences of groups of people.

It is still not easy to bridge the gap between the "complex dynamics of simple systems and the simple dynamics of complexed systems." For this reason Prof. Von Neumann would like to see the most complicated digital computing machines investigated with techniques similar to the techniques which biologists must use to investigate living organisms. The large scale statistical measurements would be correlated with the functions of the individual units, and some insight to analogous relations in living brains could be gained.

However, it was emphasized that the human brain is not the whole man or even the whole intelligence. Some important information is transmitted in the blood stream by chemicals, rather than through the nerve cells. This is particularly associated with the emotions. The memory also is probably not stored in the nerve cells, for while there are 10,000,000,000 nerve cells in the human brain, the number of individual pieces of information stored in the memory during a lifetime is probably a hundred thousand times as great.

Science News Letter, April 9, 1949

CHEMISTRY-PHYSIOLOGY

Probe Into Origins of Life

Three foreign Nobelists here are investigating muscles, transformation of sunlight into chemical energy by green plants, and the relation of food to glands.

By JANE STAFFORD

➤ THE origins of life are now being probed in researches which combine atomic science and muscle chemistry. The researches, with implications as life-saving as the atomic bomb is life-destroying, are being conducted at the U. S. Public Health Service's National Institutes of Health in Bethesda, Md., on the outskirts of the nation's capital.

Sparking them is Dr. Albert Szent-Gyorgyi of Budapest, Hungary, 1937 winner of the Nobel Prize in medicine for his discoveries resulting in the isolation and identification of vitamin C. Dr. Szent-Gyorgyi is one of three Nobel laureates now working at the National Institutes as special research fellows. The other two are Prof. Otto H. Warburg of Germany and Dr. Bernardo A. Houssay of Argentina.

Dr. Szent-Gyorgyi has a number of young scientists working under him at the National Institutes and at the newly created Muscle Institute at Woods Hole, Mass. Part of his work is carried on in consultation with the National Institutes' own biophysicist Dr. Ralph W. G. Wyckoff.

"We are approaching very fast an understanding of the basic principles of life," Dr. Szent-Gyorgyi told me in an exclusive interview at his home in Bethesda, Md., where he was recuperating from a bout with virus pneumonia.

Muscle is the material he and his associates are studying because, he said, "it is the most wonderful material to study life." It combines mechanical and visible action with chemical and energy changes which are so fast and big that they are "almost explosive."

Muscle has another attraction for scientists probing the origin of life. Most human suffering comes from wrong function of muscle, Dr. Szent-Gyorgyi pointed out in this connection. The immediate cause of death in every second man is failure of muscle.

When you speak of muscle, most people think first of the biceps in the arm, or of leg muscles used in walking. The heart muscle and the muscles in the walls of blood vessels, however, are the ones responsible for so much human suffering and death.

"Our first step into life begins with the work of muscle, the uterus, and life ends with the failure of the heart muscle," Dr. Szent-Gyorgyi pointed out.

"We cannot, however, expect to do something about the failure and disordered action of muscles until we know what muscle is," he continued.

"In the last analysis," Dr. Szent-Gyorgyi said, "life is a play of electrons in atomic shells."

Electrons are present not only in the atomic bomb but in the molecules of protein in muscle and other living tissues. Dr. Szent-Gyorgyi's aim is to unite this knowledge of electron behavior and atomic theory with knowledge of energy exchange in living material, such as muscle.

"When we can do that," he declared, "it will be child's play to tell medical scientists how to put the human machine right when some part of it goes wrong and breaks down."

We humans derive our energy for life from the sun. We get it indirectly, however, through green plants which transform the sun's light into energy to be captured by animals, including man, that eat plants or after conversion by animals into beef, lamb and pork.

How good is the green plant at transforming sunlight into chemical energy? Is it 70% efficient or only 20%? Working at the solution of this problem is another Nobel Prize winner now at the U. S. National Cancer Institute on a special fellowship. This second member of the trio of Nobel laureates at the National Institutes is Prof. Otto Warburg, director of the Kaiser-Wilhelm Institute for Cell Physiology in Berlin-Dahlem, Germany. Collaborating with him are Dr. Dean Burk of the National Cancer Institute and Dr. Sterling B. Hendrichs of the Bureau of Plant Industry, U. S. Department of Agriculture.

Prof. Warburg himself backs the green plant as being 70% efficient. He pays tribute to Nature for a great achievement in having enabled the plant to perform so efficiently. The 70% figure, he points out, is the maximum value that can be reached. The amount of energy transformation, that is, of absorbed light energy, varies with the intensity of the light reaching the plant, with the temperature, and according to whether the plant cells are young, old, or in best condition.

The difference between the 70% figure his researches have given and the 20% figure observed by other scientists is due, Prof. Warburg believes, to methods used in measuring the energy transformation. In the past physical apparatus which would fill a large laboratory has been used in the measurements. Prof. Warburg is now using a small simple piece of apparatus called an actinometer which he devised. It is so simple that a high school science student could use it, and Prof. Warburg hopes it will become useful in simple biological demonstrations.

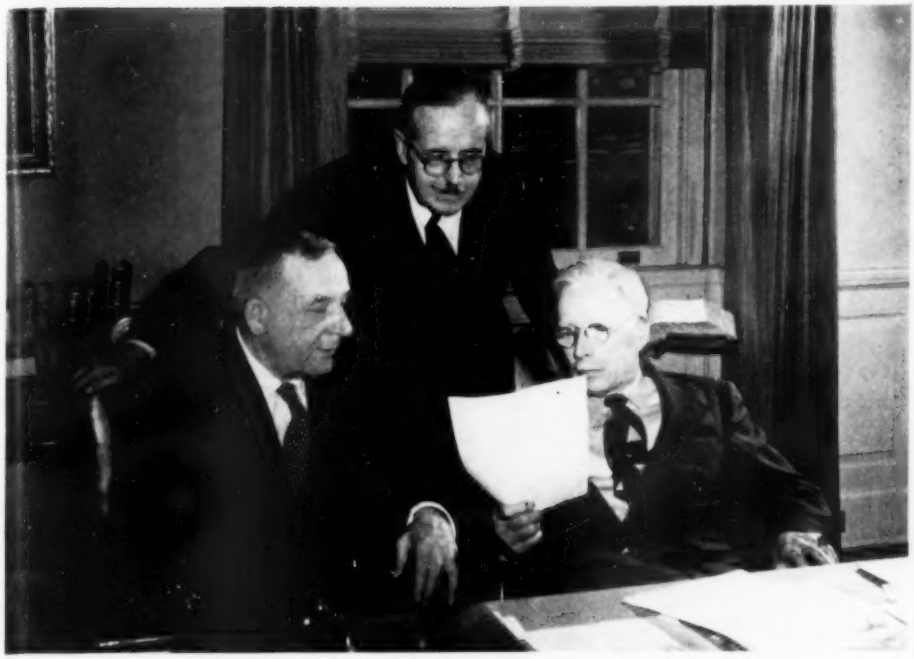
In the actinometer the amount of oxygen produced by the green plant cells as they convert light into energy is measured by the change in height of a column of fluid. The change is due to the pressure of the oxygen, and the instrument that measures it is really a manometer.

First a measurement is made with two chemicals, ethyl chlorophylide and thiourea. The chlorophylide is a form of the green coloring matter of plants by which they accomplish photosynthesis. With this process, oxygen is liberated. The thiourea picks up the oxygen as it is produced. With his roomful of physical and electrical equipment, Prof. Warburg has determined that in this process, one molecule of oxygen is consumed by the thiourea for every quantum of light shining on the chlorophyl material.

With the reading on the manometer scale as a secondary standard, Prof. Warburg next reads the scale when green plant cells alone are in the actinometer with light shining on them. If, with the same amount of light the first reading is 40, and the second, for the plant cells, is four, it means there is one-fourth the oxygen exchange per quantum of light. Turning this around, one molecule of oxygen is produced by the plant cells for every four quanta of light.

The 70% efficiency of green plants at their best is so great that Prof. Warburg does not see any hope for artificial photosynthesis as a practical means of producing

DR. ALBERT SZENT-GYORGYI —This Hungarian scientist hopes to unite atomic science with muscle chemistry for better understanding of life's basic principles.



RESEARCHERS CONFER—Prof. Otto Warburg of Germany (left) and Dr. Bernardo A. Houssay (center) of Argentina, two of the Nobel laureates, discuss plans with Dr. R. E. Dyer, director of the National Institutes of Health, where they are working as special research fellows.

food synthetically. It would be easy enough, in his opinion, to do in the laboratory what the plant does, that is, to produce carbohydrates from carbon dioxide and water under the influence of light. But it would be too complex and costly a procedure to have practical value.

"We must still have our meadows," he stated.

The food we eat and its relation to the glands in our bodies is being investigated by a third Nobelist now working at the National Institutes of Health under a special research fellowship, Dr. Bernardo A. Houssay of Argentina.

Most familiar example of a relation between food and body glands is the relation between the pancreas, which produces insulin, and sugar and starch utilization. Diabetics are taught that their bodies cannot handle sugars and starches properly because the pancreas fails to produce insulin in normal amounts. The pancreas and insulin, however, are only one part of the situation.

Two other glands, the pituitary buried deep inside the head, and the adrenals, one above each kidney, also play a part in sugar and starch handling by the body. It was in recognition of his discovery of the significance of the pituitary gland in this connection that Dr. Houssay shared in the Nobel Prize award in 1947.

If the action of the pancreas is suppressed, there is not only a lack of insulin, but also a diabetes-producing action on the part of the adrenal glands and the pituitary to contend with. If, on the other hand, the action of the pituitary and adrenal glands is suppressed, the action of insulin becomes more intense. For proper handling of sugars and starches, there must be not only healthy pancreas tissue to produce insulin but a balance between the various glands.

This matter of balance, Dr. Houssay emphasized, is the most important thing in human beings. There must be balance between glands that tend to cause increased sugar in the blood and those that tend to cause decreased sugar in the blood. There must be balance between mechanisms in the body for producing heat and for dissipating it. Many other body processes operate on this balance principle.

The glands of the body regulate many processes, such as growth, constitution, blood circulation nad behavior. But, Dr. Houssay stressed, they do not produce these things. And always there must be balance between the glands or the body does not function properly.

"If we can recover from sickness," he said, "it is because we have the mechanism for balance. Doctors and medicines they prescribe can help, but cannot produce new functions.

"The healing power of nature," he declared, "is essentially a matter of balance and its restoration."

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Sugarcane waste, the so-called bagasse, was once burned in great piles as a useless material; later it was found to be valuable as fuel in sugarcane plants, and is now used also as raw material in manufacturing a wallboard.

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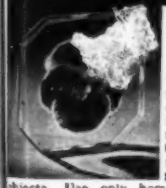

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AGRICULTURE

Crop Increases Possible

➤ HALF-STARVED peons hoeing half-cultivated fields of scrawny corn are not a necessary picture of tropical American agriculture at all. Food yields can be greatly increased in the countries to the south, declared Robert P. Russell, vice president of the International Basic Economy Corporation, in an address before the Massachusetts Institute of Technology Mid-Century Convocation on the Social Implications of Scientific Progress.

Improvement in food production in Latin-American lands is possible along many different lines, all mutually supporting the others, the speaker stated. One reason why food is scarce and dear at present is because labor is scarce and inefficient, and labor is in this bad case partly because of malaria and other diseases, partly because of malnutrition. Improve sanitation and health, and improvement in production will follow.

Again, cultivation methods are often antiquated and farm machinery, even of the simplest kinds, scarce or altogether lacking. Fertilizer has never been used on much of the land, weeds are "so luxuriant as to be beyond the imaginative capacity of the U. S. dirt farmer, plus insects and plant diseases of a variety and virulence not encountered in more temperate climates."

It has already been proved, however, by progressive Latin-American farmers that vast improvements are possible. Corn yield per acre has been more than trebled in certain limited areas; and the speaker expressed his faith that this increase can be greatly extended through use of machine cultivation and harvesting methods, use of chemical weed-killers, and improved storage conditions.

In another place, two young farmers planted upland rice despite pessimistic prophecies of failure by their more conservative neighbors. They made free use of fertilizer on part of their land, and kept their few tractors going practically around the clock. News of their success has spread rapidly, and many of last year's doubters are this year's converts.

Success stories of this kind, Mr. Russell declared, are the best possible kind of propaganda for the use of modern production methods, and he concluded:

"We in the United States have a great opportunity to join with others and to share our vast resources of technological and managerial experience, in order to help others help themselves."

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ENGINEERING

Range-Finder Tested In Climate Chamber

➤ A SPECIAL set-up for the study of range-finder performance under various climatic conditions has been established at the National Bureau of Standards, with the cooperation of the Army Ordnance Department. This laboratory is the only one of its kind in the United States, and so far as is known, the most complete in the world.

The laboratory is equipped for the complete analysis of range-finder behavior under controlled conditions corresponding to a wide range of climate. A specially designed precision instrument which optically simulates a target at eight different ranges with elevations from 0 to 90 degrees is part of the equipment.

Optical range-finders which this laboratory will test are used by the Armed Forces to measure the distance from an observer to a target, and are among the most intricate and costly optical instruments yet developed. The range is obtained by a triangulation method, in which the rays of light proceeding from the target to the range-finder form a triangle with the base length of the instrument.

For satisfactory measurement of range at usual target distances, the error in detemination of the very small angle between the rays from the target must be exceedingly small. The rough treatment received in wartime transport, the large size of the instrument, and other factors make attainment of this accuracy difficult. The range-finder must, therefore, be so designed that the instrumental errors are eliminated or compensated.

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GEOLOGY

Horses Due to Disappear, Evolutionary Curve Shows

➤ THE horse isn't here to stay. In a relatively short time—geologically speaking—Dobbin will disappear.

Ultimate vanishing date for the horse was set at perhaps 15 or 20 million years hence by Prof. Laurence L. Sloss, Northwestern University geologist, speaking in St. Louis before the meeting of the Association of Petroleum Geologists. To geologists, 15 or 20 million years are only a few watch-ticks as compared to the half-billion years during which life has existed on this planet.

Prof. Sloss based his prediction on the known history of horses and horse-like animals. Like all other animals, he said, horses began with a few small species, increased their number as geologic ages passed, and then began to dwindle. By projecting the now descending curve he found it touched the zero line at the 15-to-20 million year mark.

In order to trace the rise and decline of any animal group, and to predict its end, he explained, it is necessary to have plenty of fossils. For this reason, it is impossible to forecast man's geologic future.

"Man's fossil record is fragmentary," Prof. Sloss pointed out, "because he was smart enough to stay out of places where he could become fossilized."

Science News Letter, April 9, 1949

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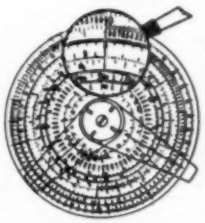

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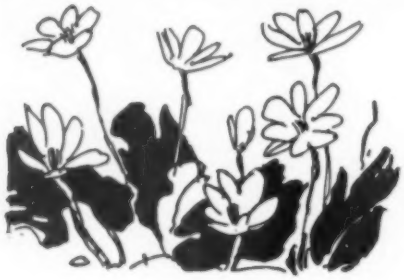
BOTANY

NATURE RAMBLINGS

by Frank Thone



Showers and Flowers

➤ APRIL showers, says the old rhyming adage, bring forth May flowers. Stated that way, this bit of folk wisdom is beyond challenge. Another form, however, that declares, "April showers make May flowers," doesn't stand up so well to critical examination.

For May flowers—and those that blossom in April, too—are made long before even the earliest of spring rains fall. The great majority of the flowers that bloom in the spring are perennials, springing either from underground rootstocks or from the woody branches of trees and shrubs. In either case they draw on stocks of foodstuffs that were made and stored during the showers and suns of last summer and autumn. So it would be more accurate to say, "June to October showers make May flowers, but April showers bring them forth," only both rhyme and scansion are bad, in that way of stating it.

May flowers are "made" by the parent plant's activities of the previous season not only in the elaboration and storage of the food materials needed for their opening and expansion when the snows vanish and the sun grows bolder, but in the formation and stowing away of the flower-parts themselves. And the same is true of the new leaves that are beginning to appear on all manner of perennial plants. The beginnings of petals and sepals, stamens and pistils, leaf-blades and petioles were all made last summer in tucked-away, well-hidden buds.

Everything was folded up very tightly, all parts were small but capable of swift growth when the soil warms up and the roots begin to supply plenty of sap. Like the old recipe on tinned-soup container: "Just add water and serve." In general, you will find the parts of spring flowers juicer than the corresponding parts of flowers that blossom in the drier months of summer and autumn.

Without needing to know the technical physiological or ecological reasons why it happens, all of us take advantage of this preformation and storing of flowers when we force hyacinth or narcissus bulbs for late-winter blooming, or bring cut branches of forsythia, lilac or pussy-willow into the house. Impatient for spring, we compel a little foretaste of it in January or February by subjecting these buds and their stored food supplies to a simulated April.

Science News Letter, April 9, 1949

Ethyl alcohol, given intravenously, is reported to relieve children suffering from asthma.

Sixteen authors, selected on the basis of their knowledge of their subjects and their ability to explain them to the general reader, are writing 22 chapters on "The Meaning of Mathematics", ranging from beginning algebra through graduate courses.

These articles began running in the Mathematics Magazine of March-April 1948. This magazine is published bi-monthly, except July-August. Its editorial policy is to make mathematics understandable. Some call the above chapters "Understandable Chapters in Mathematics". Subscription price is $3.00. The present volume plus the March-April and May-June issues of the previous volume can be had for $4.20, as long as the back issues last.

Address: MATHEMATICS MAGAZINE, Department c
405 Hilgard Avenue
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NATURAL RESOURCES-ECONOMICS

Formula To Improve Neglected Areas

➤ UNDERDEVELOPED areas of the world can be made better homes for their people, but the process is going to require time, much more knowledge of the regions than we now possess, and a great deal of patience by both "improvers" and "improvees".

These were points of agreement between two of the speakers at the Massachusetts Institute of Technology Mid-Century Convocation on the Social Implications of Scientific Progress, Pierre Ryckmans, Belgian representative on the U. N. Trusteeship Council and formerly governor-general of the Belgian Congo, and Lord Hailey, chairman of the British Colonial Research Committee and formerly governor of the Punjab.

"The standards of life of any people," Lord Hailey pointed out, "must in the long run depend on two factors, the natural resources of the country, and the capacity of the people to make the best use of them."

In underdeveloped areas as represented both by the present British colonies and by equatorial Africa, there are serious lacks in certain important resources, and large gaps in our knowledge of resources known to exist. Comprehensive surveys of resources are needed before any large-scale program can safely go ahead, the speakers agreed; and Lord Hailey added that outside help, such as that rendered recently by American geologists, is being welcomed.

In developing these resources, one runs into the dilemma of outside capital. Because of the risks, the foreign investor is likely to demand high returns; because of his demand for high returns, the risk of expropriation increases. As a possible way out, Mr. Ryckmans suggested the working out, under United Nations sponsorship, of an international code of foreign private investment, aiming at justice and fair practice for both sides.

In meeting the problems presented by the peoples of underdeveloped areas, both speakers said, it will be necessary to do a good deal towards improving general health by medical and sanitary aid, and towards raising the general level of working efficiency by securing ampler and better balanced diets.

This, however, will be only a beginning. There will have to be great improvements in education and technical training, to enable the peoples of these areas eventually to get along without foreign assistance. And some of the peoples, notably those of tropical Africa, will be starting from away behind scratch, for their own cultural traditions provide no foundation at all for efforts at self-improvement. The educational process therefore will require much time as well as much patience.

Science News Letter, April 9, 1949

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W. Washington 6, D. C. Ask for free publications direct from issuing organizations.

ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR—*Govt. Printing Office*, 427 p., illus., paper, $1.00.

BASIC ELECTRICAL ENGINEERING. George F. Corcoran—*Wiley*, 449 p., illus., $4.50. A textbook intended for preparatory courses in electrical engineering.

BEADS OF METEORIC IRON FROM AN INDIAN MOUND NEAR HAVANA, ILLINOIS—Robert M. Grogan—*Illinois State Museum* (reprinted from *American Antiquity*), 5 p., illus., paper, free upon request to publisher, Springfield, Illinois.

BITS THAT GROW BIG: The Story of Plant Reproduction—Irma E. Webber—*William R. Scott*, 64 p., illus., paper, $1.50. A delightful juvenile book concerned with plants and their reproduction. Many experiments to perform. Exceptionally well illustrated.

CARDIAC CATHETERIZATION IN CONGENITAL HEART DISEASE—Andre Cournand, Janet S. Baldwin and Aaron Himmelstein—*Commonwealth*, 108 p., illus., $4.00. The technique of cardiac catheterization as a means of diagnosing congenital anomalies of the heart and large vessels is presented. Well illustrated.

CURRENT TRENDS IN SOCIAL INSURANCE LEGISLATION—Harry G. Waltner, Jr.—*Industrial Hygiene Foundation*, 9 p., paper, free upon request to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

DEVELOPMENT OF A BLISTER RUST CONTROL POLICY FOR THE NATIONAL FORESTS IN THE INLAND EMPIRE—Donald N. Matthews and S. Blair Hutchison—*U. S. Dept. of Agriculture, Northern Region*, 116 p., illus., paper, free upon request to publisher, Federal Building, Missoula, Montana. A technical report intended to provide guidelines for national forest administration in the white pine belt.

EXPLORING FOR MUSHROOMS, Series No. 3—Virginia S. Eifert—*Illinois State Museum*, 45 p., illus., paper, free upon request to publisher, Springfield, Illinois. An introduction to a few of the commoner mushrooms found in Illinois and the central states.

FETAL AND NEONATAL DEATH—Edith L. Potter and Fred L. Adair—*University of Chicago Press*, 173 p., illus., $3.75. A revision of a work first published in 1937. Brought completely up to date, with new section on the Rh factor and the effect of maternal German measles on the fetus.

FOUNDATIONS OF MODERN PHYSICS—Thomas B. Brown—*Wiley*, 2nd ed., 391 p., illus., $5.00. Modern physics is made understandable without using advanced mathematics. Includes recent advances in physical knowledge.

HISTORICAL INTRODUCTION TO MODERN PSYCHOLOGY—Gardner, Murphy—*Harcourt Brace*, rev. ed., 466 p., $6.00. Revised to bring the discussions of the modern period up to date. Written from the author's perspective without any special attempt at objectivity.

HOW GOOD ARE TESTING METHODS FOR CONSUMER-USED TEXTILES?—Jules Labarthe, Jr.—*American Standards Association*, 3 p., illus., paper, free upon request to Mellon Institute of Industrial Research, Pittsburgh 13, Pa.

HOW TO TELL YOUR CHILD ABOUT SEX—James L. Hymes, Jr.—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Provides simple answers, in terms that will be helpful to parents, to the specific questions that children ask.

ILLINOIS MAMMALS—Virginia S. Eifert—*Illinois State Museum*, 38 p., illus., paper, free of charge upon request to publisher, Springfield, Illinois. Description of the animals in the Illinois State Museum.

ILLINOIS RECORDS OF 1000 A.D.—Thorne Deuel—*Illinois State Museum*, 230 p., illus., paper, free upon request to publisher, Springfield, Illinois. These records are not written but consist of such revealing objects as tools, ornaments, and human skeletons.

INTELLECTUAL ABILITIES IN THE ADOLESCENT PERIOD—David Segel—*Govt. Printing Office*, 41 p., illus., paper, 15 cents. A study and analysis on the secondary school level based in part on the results of Army aptitude tests adapted for secondary schools.

AN INTRODUCTION TO CHEMICAL SCIENCE—William H. Hatcher—*Wiley*, 2nd ed., 449 p., illus., $4.00. Extensively revised emphasizing the fundamentals of chemical composition and reaction. Includes new material on modern developments in plastics, and a consideration of chemistry in the home.

INTRODUCTORY FOODS—Osee Hughes—*Macmillan*, rev. ed., 575 p., illus., $4.25. For college freshmen and sophomores. Revised to include more basic recipes and methods for using them.

INVITATION TO BIRDS—Virginia S. Eifert—*Illinois State Museum*, 64 p., illus., paper, free upon request to publisher, Springfield, Illinois. Report on a few of the well known birds in Illinois. Well illustrated.

MAGAZINES IN THE UNITED STATES—James Playsted Wood—*Ronald*, 312 p., illus., $4.00. A chronological history showing the social and economic influence of magazines in the United States.

MOSSES OF GUATEMALA: Fieldiana: Botany, Volume 25—Edwin B. Bartram—*Chicago Natural History Museum*, 442 p., illus., paper, $4.00. A realistic analysis of the mosses of a restricted tropical American country.

OKINAWA: THE LAST BATTLE: The U. S. Army in World War II, The War in the Pacific—Roy E. Appleman and others—*Govt. Printing Office*, 529 p., illus., $6.00. A detailed report of the last battle in the Pacific. Excellent illustrations.

PHOTOSYNTHESIS IN PLANTS: A monograph of the American Society of Plant Physiologists—James Franck and W. E. Loomis, Eds.—*Iowa State College Press*, 500 p., illus., $7.00. A report of 34 leading authorities and principal research workers on their latest findings.

QUANTUM MECHANICS—Leonard I. Schiff—McGraw-Hill, 404 p., illus., $5.50. A text for graduate students already familiar with atomic structure.

RELATIVITY FOR THE MAN IN THE STREET—Laban Lacy Rice—*Cumberland University Press*, 104 p., illus., $1.75. An attempt to put the relativity theory into language understandable to the general public. The author has succeeded in making a presentation without mathematics, but while it is not learned, it may still be difficult for many to understand.

THE STORY OF ILLINOIS—Virginia S. Eifert—*Illinois State Museum*, 2nd rev. ed., 19 p., illus., paper, free upon request to publisher, Springfield, Illinois. History and prehistory.

TABLES OF GENERALIZED SINE- AND COSINE-INTEGRAL FUNCTIONS, Part I,—Staff of the Computation Laboratory—*Harvard University Press*, 462 p., illus., $10.00. These tables, which are carried to the sixth decimal place, are computed by the Automatic Sequence Controlled Calculator.

TABLES OF GENERALIZED SINE- AND COSINE-INTEGRAL FUNCTIONS, Part II—Staff of the Computation Laboratory—*Harvard University Press*, 560 p., illus., $10.00.

THIS IS READING—*Association for Childhood Education*, 40 p., paper, 75 cents. A bulletin on how and when to teach children to read.

T.V.A. ON THE JORDAN—James B. Hays and A. E. Barrekette—*Public Affairs Press*, 114 p., illus., paper, $5.00. A report on proposals for irrigation and hydroelectric development in Palestine.

TWENTY-NINTH ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS, 1943: including technical reports nos. 752 to 773. *Govt. Printing Office*, 446 p., illus., $3.25. An extensive report on military effectiveness of America's aeronautical weapons.

VISON THE MINK—John and Jean George—*Dutton*, 184 p., illus., $2.50. Authentic-nature lore written with drama and warm understanding. Primarily for teen-agers who love the out-of-doors.

Science News Letter, April 9, 1949

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• New Machines and Gadgets •

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PLASTIC CHAIR, pressure-molded in a form to fit the human body, is made of plastic resins reinforced with natural or synthetic fiber. In making, the combination mixture is put in a steel mold, pressure applied, then baking heat for five minutes. It is a one-piece affair except for its steel legs.

Science News Letter, April 9, 1949

ANIMAL REPELLER, claimed effective in keeping dogs, cats, rabbits and other such pests out of the home garden, uses a chemical with an odor objectionable to animals but inoffensive to humans.

Science News Letter, April 9, 1949

FLUORESCENT LAMP, that needs no electrical current, produces light when its bulb, containing mercury and phosphor particles, is shaken. The mercury and phosphor are sealed in the bulb in an atmosphere of rare gas at low pressure. The device may have application in automobiles.

Science News Letter, April 9, 1949

WINDOW SHADES, particularly for apartments and other places where there are fire hazards, are made of a fiber treated to make them fire-resistant and will char but will not support combustion.

Science News Letter, April 9, 1949

NEEDLE THREADER, shown in the picture, is a simple device that does the job merely by pushing a button, permitting even a blind man to thread a needle after he inserts it in the top with the needle eye down. The case is a black plastic.

Science News Letter, April 9, 1949

TIRE-CHANGING light, for use at night on the highway, is stored in the glove compartment until needed, when it is set in the road, electrically connected into the cigar lighter outlet. By means of a reflector, it throws white light on the work, while a blinking red light behind the reflector gives warning to approaching cars.

Science News Letter, April 9, 1949

TABLE FEET, quickly attachable to the legs of a card table, increase its height to permit temporary use as an extension to a dining-room table. They are four sturdily constructed tubes, with inside hardwood plugs, which fit over the ends of the card-table legs.

Science News Letter, April 9, 1949

ASH-TRAY lamp is for living room or office use on table or desk, and consists of a lamp and shade and a stand with a base designed to hold an ash tray. The base and upright are of a bronze finish, and the removable ash tray is amber glass.

Science News Letter, April 9, 1949

Do You Know?

The average yield of *mushrooms* produced by commercial growers is from one to one and one-half pounds per square foot.

"Self-budgeting" *fertilizer*, under test, is intended to supply nitrogen to plants at a predetermined rate over long periods of time.

The amount of commercial *fertilizers* used in America today is twice the quantity used in 1940; some 16,000,000 tons were used in 1948.

The present trend toward small decentralized *industrial plants* is based in part on the ability of trucks to provide flexible transportation.

In the brass and copper industry, a *rod* is a solid straight piece which is round, hexagonal or octagonal in cross section; a *bar* is square or rectangular.

Measurements of temperatures, vertical distribution of ozone, cosmic ray intensity and other phenomena are being made at altitudes of 72 miles by *rocket-borne instruments*.

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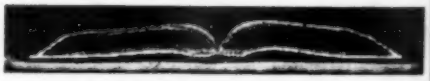

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